

B

	<i>LD50 (pfu)</i>		
	WT	AV1	AV2
<i>IN</i>			
Balb/c	1×10^4	3×10^8	2.5×10^8
CD-1	1×10^8	2×10^8	nd
<i>IV</i>			
CD-1	1×10^8	8×10^9	nd

C

	<i>PFU</i>	<i>Morbidity</i>	<i>Mortality</i>
WT VSV	10^1	3/3	3/3
AV2	10^7	0/3	0/3
AV@(10^6) + WT VSV	10^1	0/3	0/3
	10^2	0/3	0/3
	10^3	0/3	0/3

FIGURE 1A-C

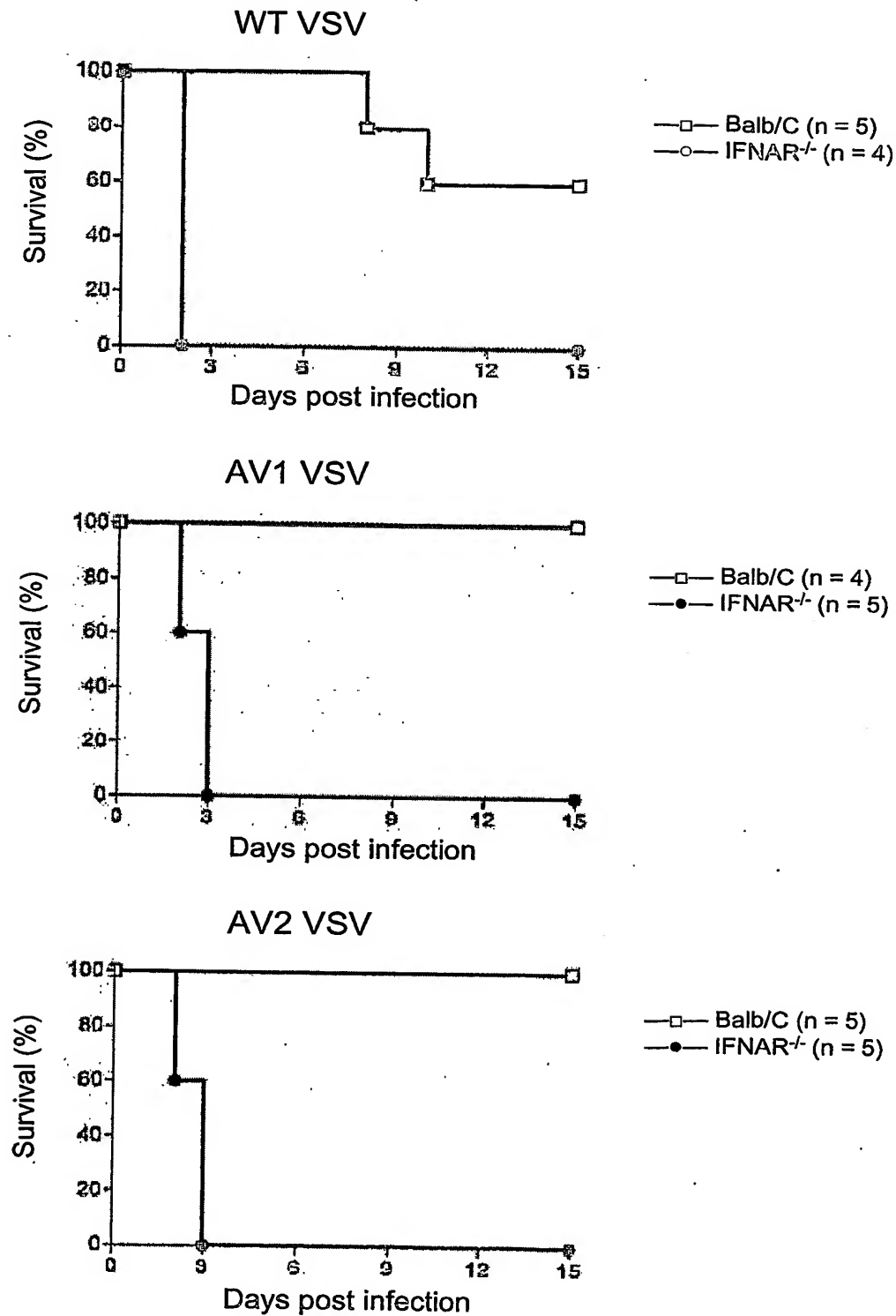


FIGURE 1D

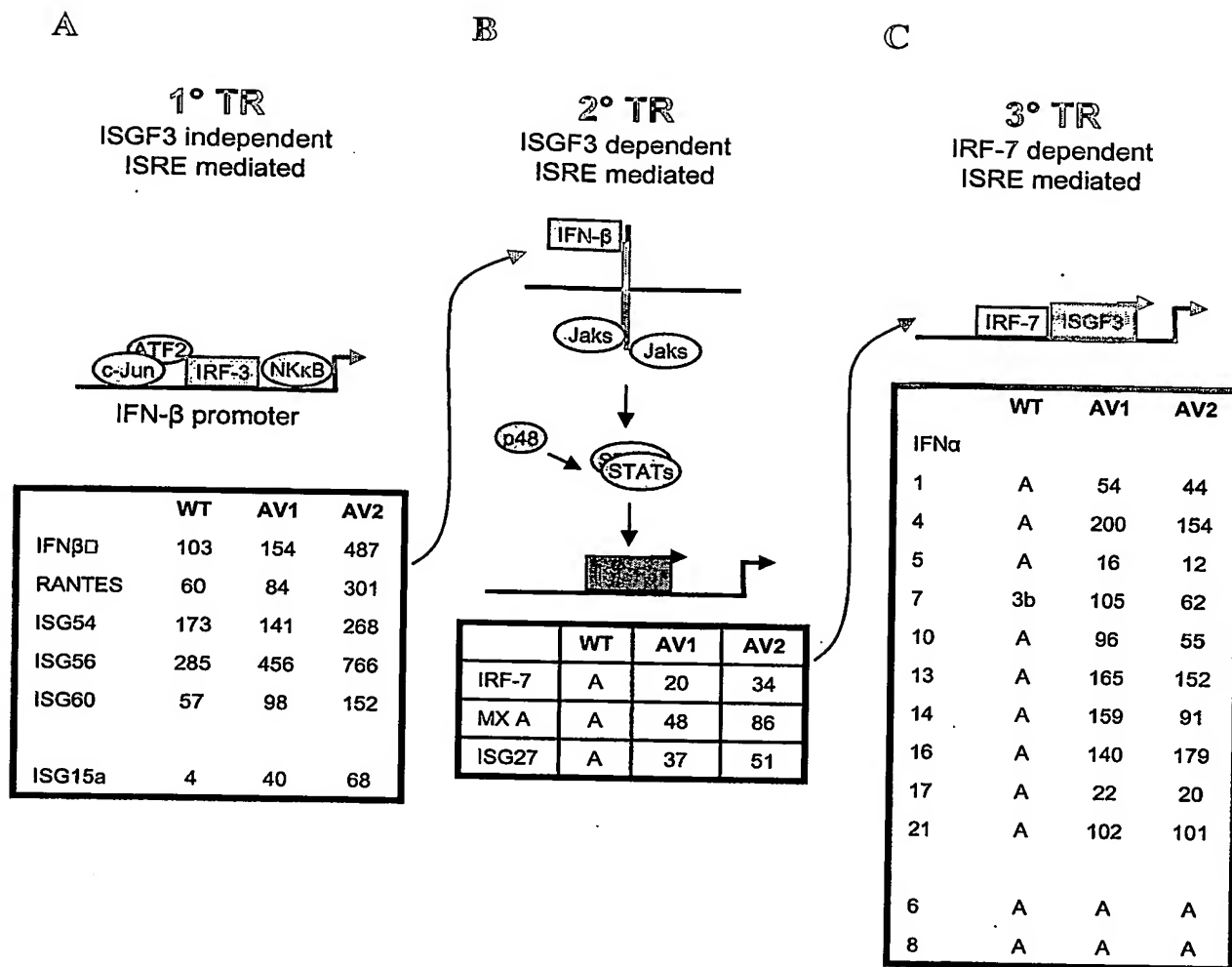
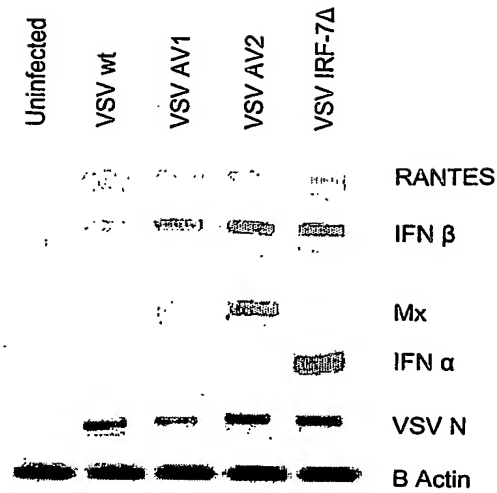


FIGURE 2A-C

D



E

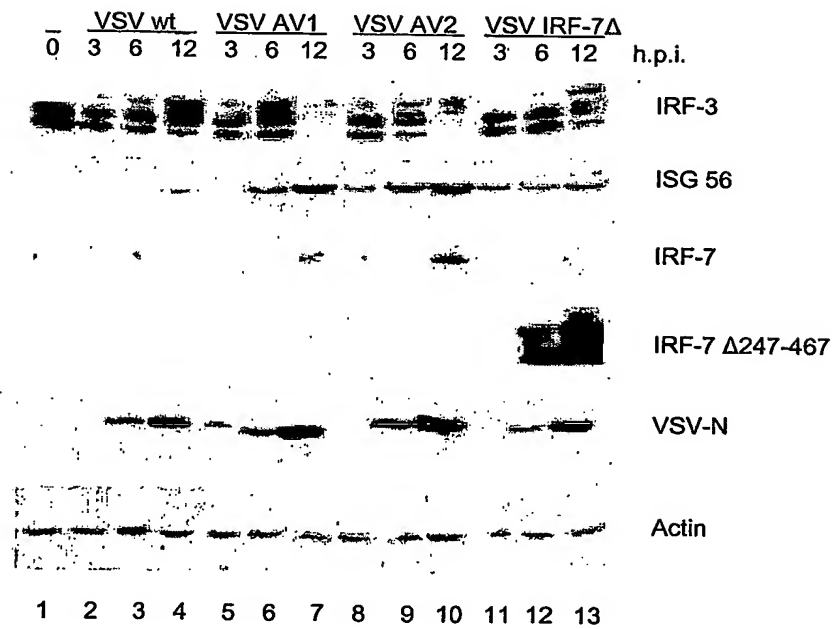


FIGURE 2D-E

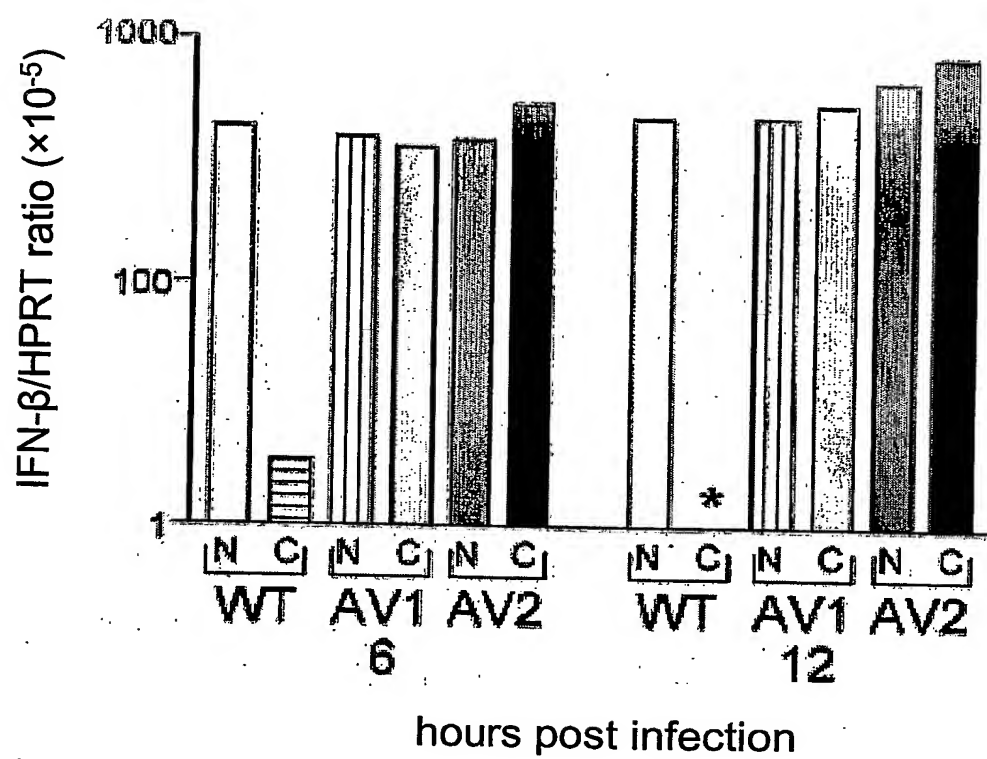


FIGURE 3

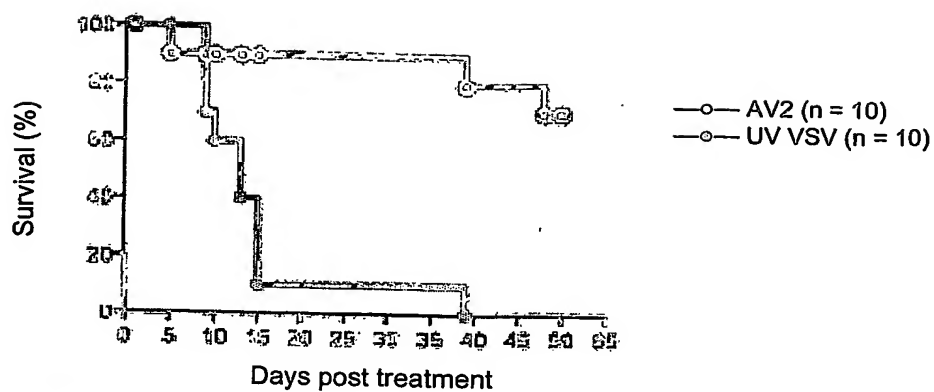
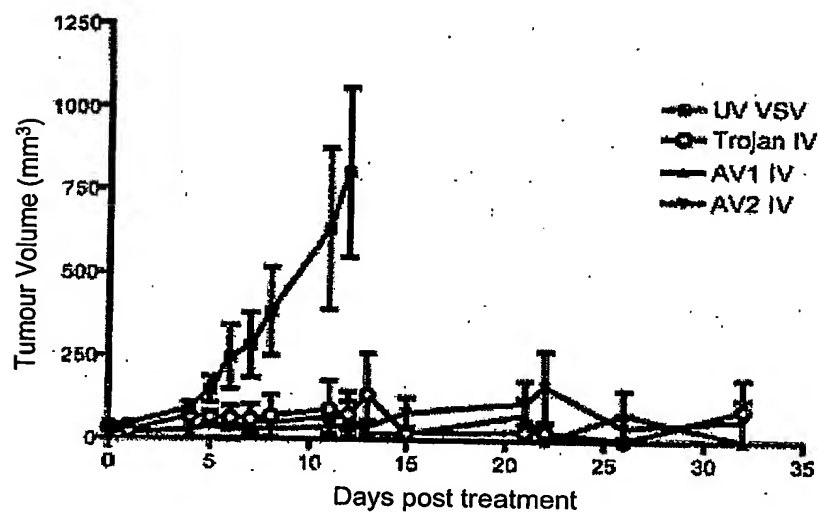
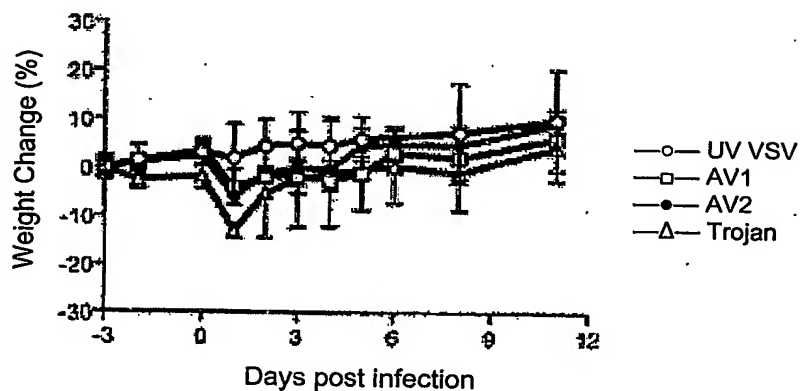
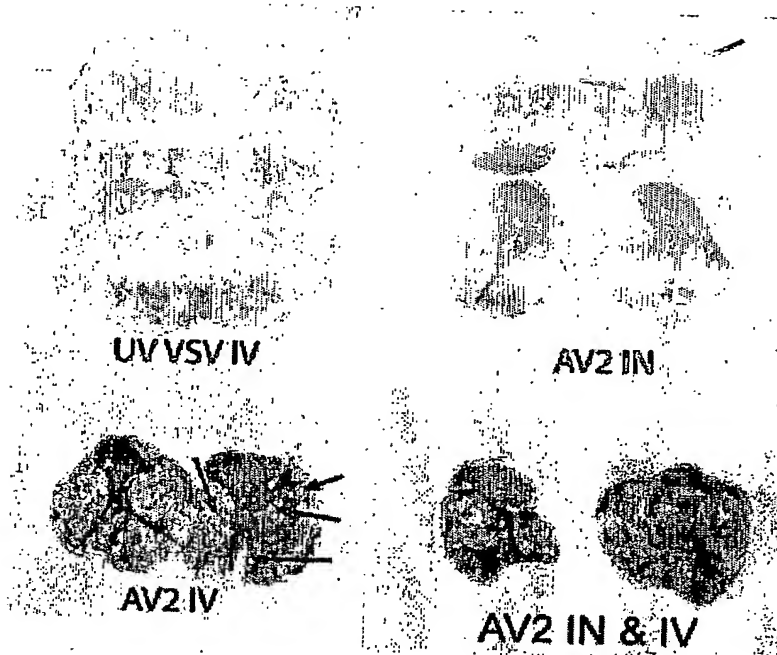
A**B****C**

FIGURE 4A-C

D



E

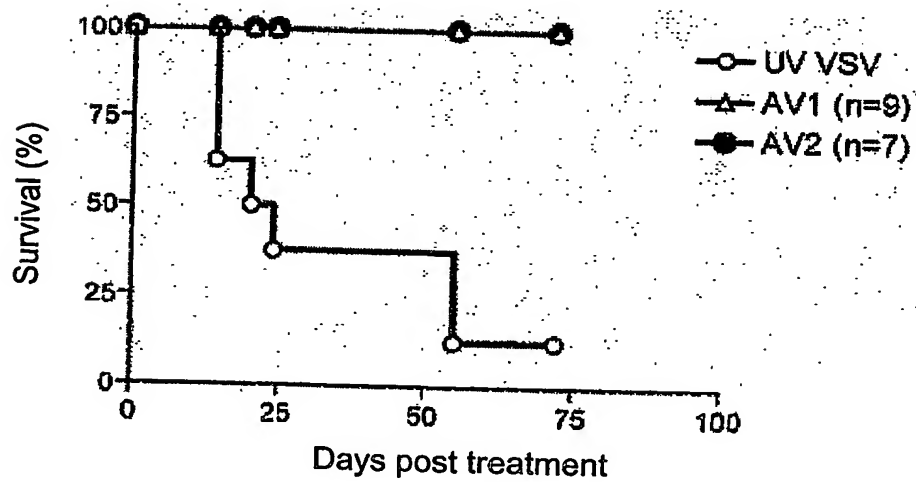
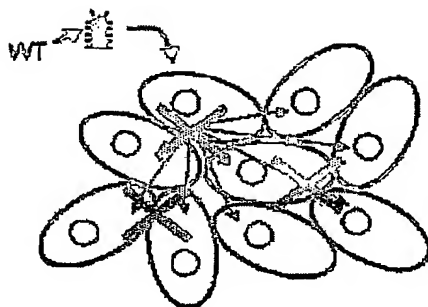


FIGURE 4D-E

A



B

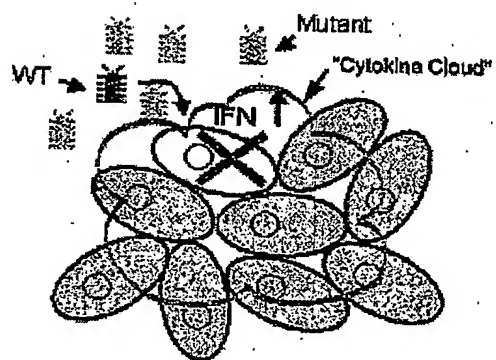


FIGURE 5

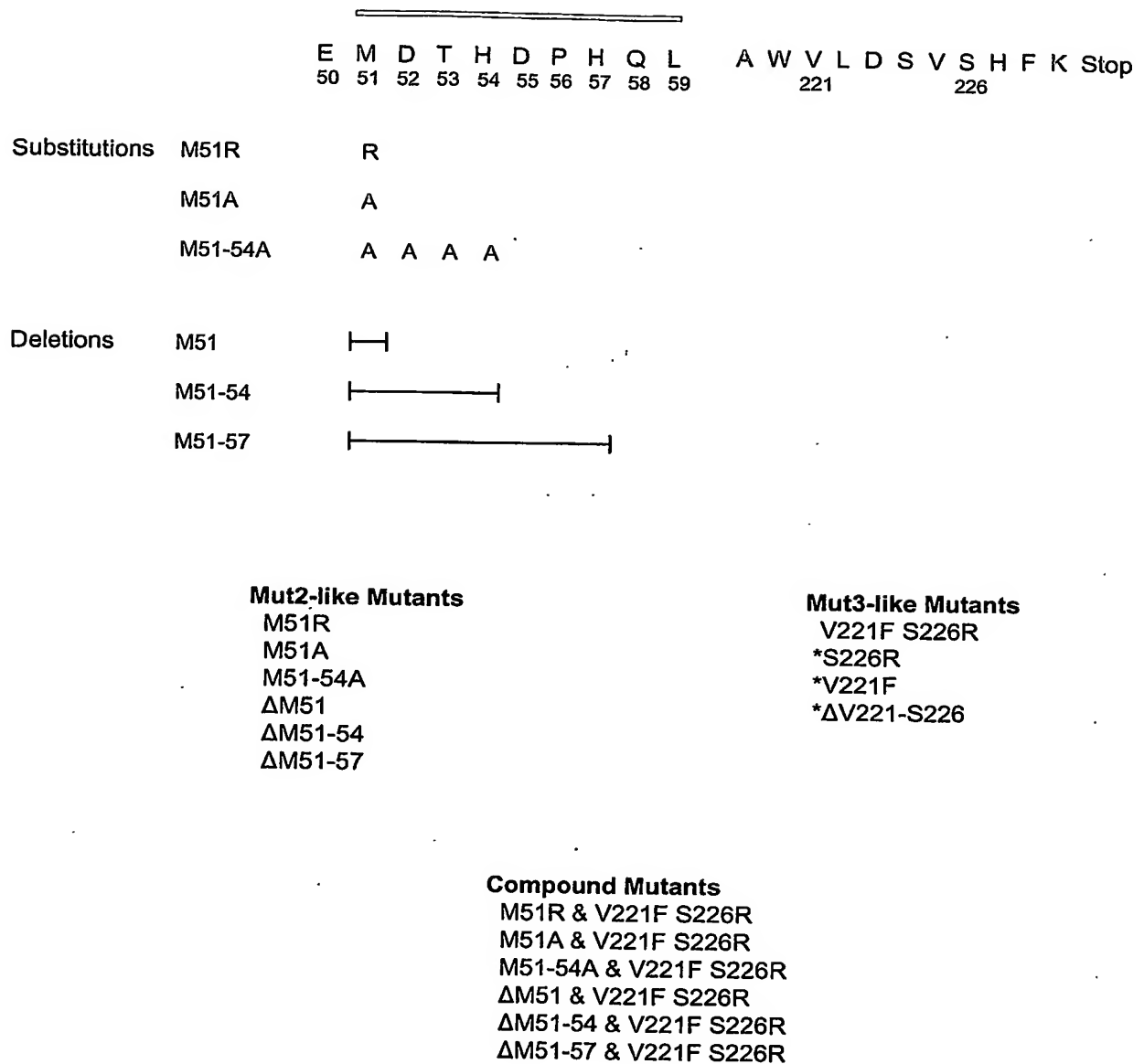
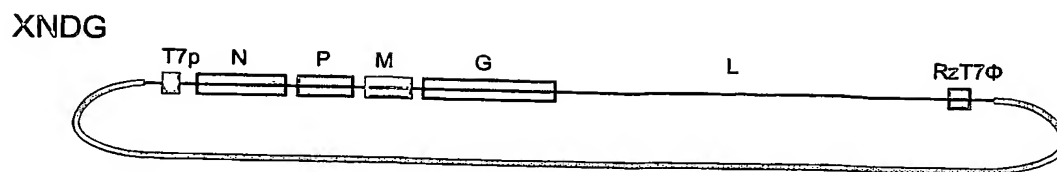


FIGURE 6



XNDG

E	M	D	T	H	D	P	H	Q	L
50	51	52	53	54	55	56	57	58	59

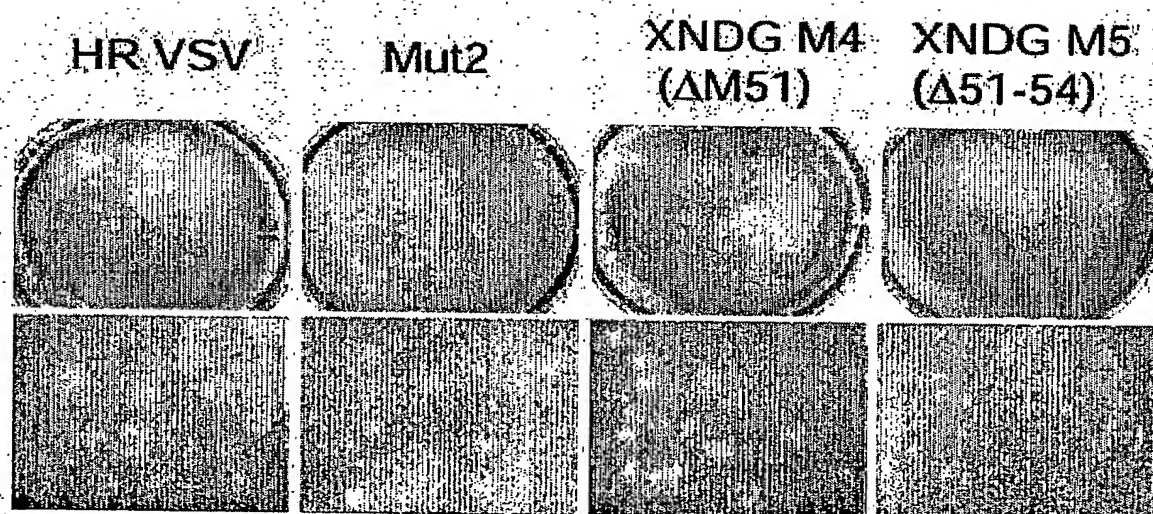
XNDG M4

E	X	D	T	H	D	P	H	Q	L
50		52	53	54	55	56	57	58	59

XNDG M5

E	X	X	X	X	D	P	H	Q	L
50					55	56	57	58	59

FIGURE 7

**FIGURE 8**

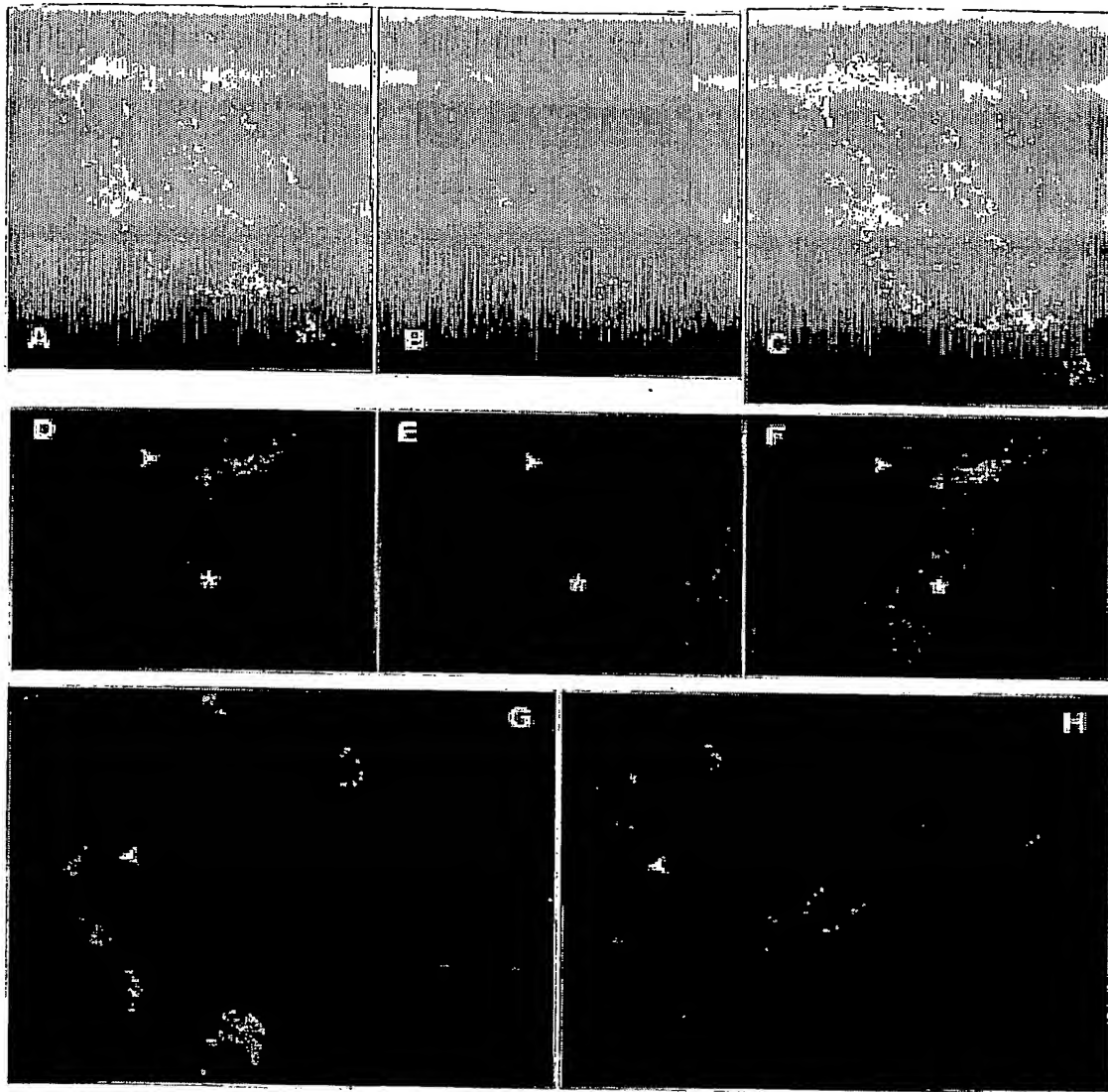


FIGURE 9A-H

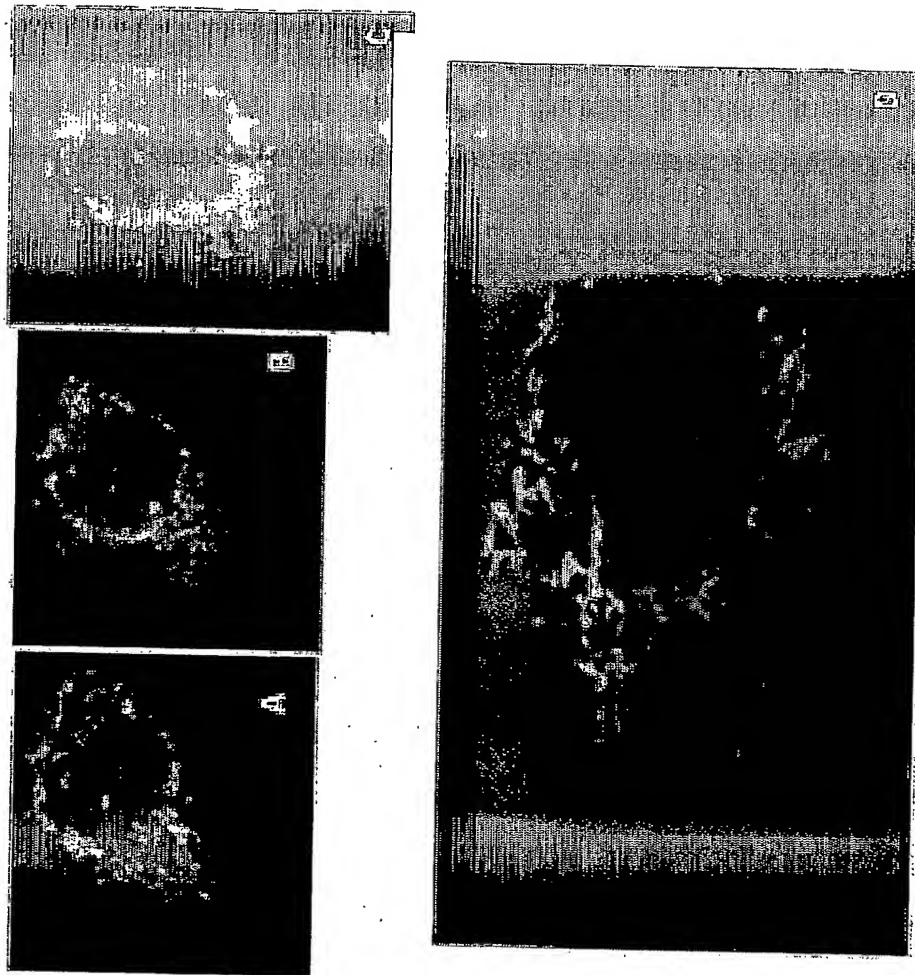


FIGURE 10

Genome Sequence for VSV Mutant AV1

ACGAAGACAAACAAACCATATTATTATCATTAAAAGGCTCAGGAGAAACTTTAACAGTAATCAAATGTCTGTT
ACAGTCAAGAGAATCATTGACAACACAGTCATAGTTCCAAAACCTTCTGCAAAATGAGGATCCAGTGGAATAC
CCGGCAGATTACTTCAGAAAAATCAAAGGAGATTCTCTTTACATCAATACTACAAAAAGTTTGTGATCTA
AGAGGATATGTCTACCAAGGCCTCAAATCCGGAATGTATCAATCATACTGTCAACAGCTACTTGTATGGA
GCATTGAAGGACATCCGGGGTAAGTTGGATAAAGATTGGTCAAGTTTTCGGAATAAACATCGGGAAGGCAGGG
GATACAATCGGAATATTTGACCTTGTATCCTTGAAAGCCCTGGACGGTGTACTTCCAGATGGAGTATCGGAT
GCTTCCAGAACCAGCGCAGATGACAAATGGTTGCCCTTTGTATCTACTTGGCTTATACAGAGTGGGCAGAACA
CAAATGCCTGAATACAGAAAAAGGCTCATGGATGGGCTGACAAATCAATGCAAAATGATCAATGAACAGTTT
GAACCTCTTGTGCCAGAAGGTCGTGACATTTTTGATGTGTGGGGAAATGACAGTAATTACAAAAATTGTC
GCTGCAGTGGACATGTTCTTCCACATGTTCAAAAAACATGAATGTGCCTCGTTCAGATACGGAACTATTGTT
TCCAGATTCAAAGATTGTGCTGCATTGGCAACATTTGGACACCTCTGCAAAATAACCGGAATGTCTACAGAA
GATGTAACGACCTGGATCTTGAACCGAGAAGTTGCAGATGAGATGGTCCAAATGATGCTTCCAGGCCAAGAA
ATTGACAAGGCCGATTATACATGCCTTATTTGATCGACTTTGGATTGTCTTCTAAGTCTCCATATTCTTCC
GTCAAAAACCTTGCCTTCCACTTCTGGGGGCAATTGACAGCTCTTCTGCTCAGATCTACCAGAGCAAGGAAT
GCCCGACAGCCTGATGACATTGAGTATACATCTCTTACTACAGCAGGTTTGTGTACGCTTATGCAGTAGGA
TCCTCTGCTGACTTGGCACAACAGTTTTGTGTTGGAGATAGCAAATACACTCCAGATGATAGTACCGGAGGA
TTGACGACTAATGCACCGCCACAAGGCAGAGATGTGGTCGAATGGCTCGGATGGTTTGAAGATCAAAACAGA
AAACCGACTCCTGATATGATGCAGTATGCGAAACGAGCAGTCATGTCACTGCAAGGCCTAAGAGAGAAGACA
ATTGGCAAGTATGCTAAGTCAGAATTTGACAAATGACCCTATAATTCTCAGATCACCTATTATATATTATGC
TACATATGAAAAAACTAACAGATATCATGGATAATCTCAAAAAGTTTCGTGAGTATCTCAAGTCCTATTCT
CGTCTAGATCAGGCGGTAGGAGAGATAGATGAGATCGAAGCACAACGAGCTGAAAAGTCCAATTATGAGTTG
TTCCAAGAGGACGGAGTGAAGAGCATACTAGGCCCTCTTATTTTCAGGCAGCAGATGATTCTGACACAGAA
TCTGAACCAGAAATTGAAGACAATCAAGGCTTGTATGTACCAGATCCGGAAGCTGAGCAAGTTGAAGGCTTT
ATACAGGGGCTTTAGATGACTATGCGGATGAGGACGTGGATGTTGTATTCACTTCGGACTGGAAACAGCCT
GAGCTTGAATCCGACGAGCATGGAAAGACCTTACGGTTGACATTGCCAGAGGGTTTAAGTGGAGAGCAGAAA
TCCCAGTGGCTTTTGACGATTAAAGCAGTCGTTCAAAGTGCCAAACACTGGAATCTGGCAGAGTGCACATTT
GAAGCATCGGGAGAAGGGTTCATCAAAAAAGCGCCAGATAACTCCGGATGTATATAAGGTCACTCCAGTG
ATGAACACACATCCGTCCCAATCAGAAGCCGTATCAGATGTTTGGTCTCTCTCAAAGACATCCATGACTTTC
CAACCCAAGAAAGCAAGTCTTCAGCCTCTCACCATATCCTTGGATGAATTGTTCTCATCTAGAGGAGAATTC
ATCTCTGTGCGAGGTAACGGACGAATGTCTCATAAAGAGGCCATCCTGCTCGGTCTGAGGTACAAAAGTTG
TACAATCAGGCGAGAGTCAAATATTCTCTGTAGACTATGAAAAAAGTAACAGATATCACAATCTAAGTGTT
ATCCCAATCCATTCATCATGAGTTCCTTAAAGAAGATTCTCGGTCTGAAGGGGAAAGGTAAGAAATCTAAGA
AATTAGGGATCGCACCACCCCTTATGAAGAGGACACTAACATGGAGTATGCTCCGAGCGCTCCAATTGACA
AATCCTATTTTGGAGTTGACGAGAGGGACACTCATGATCCGCATCAATTAAGATATGAGAAATCTTCTTTA
CAGTGAAAATGACGGTTAGATCTAATCGTCCGTTCAGAACATACTCAGATGTGGCAGCCGCTGTATCCCATT

FIGURE 11

GGGATCACATGTACATCGGAATGGCAGGGAAACGTCCCTTCTACAAGATCTTGGCTTTTTTGGGTTCTTCTA
ATCTAAAGGCCACTCCAGCGGTATTGGCAGATCAAGGTCAACCAGAGTATCACGCTCACTGTGAAGGCAGGG
CTTATTTGCCACACAGAATGGGGAAGACCCCTCCCATGCTCAATGTACCAGAGCACTTCAGAAGACCATTCA
ATATAGGTCTTTACAAGGGAACGGTTGAGCTCACAATGACCATCTACGATGATGAGTCACTGGAAGCAGCTC
CTATGATCTGGGATCATTTCAATTCTTCCAAATTTTCTGATTTTCAGAGAGAAGGCCTTAATGTTTGGCCTGA
TTGTGCGAGAAAAAGGCATCTGGAGCTTGGGTCCTGGATTCTGTGAGCCACTTCAAATGAGCTAGTCTAGCTT
CCAGCTTCTGAACAATCCCCGGTTTACTCAGTCTCTCCTAATTCAGCCTTTTCGAACAATAATATCCTGTC
TTTTCTATCCCTATGAAAAAACTAACAGAGATCGATCTGTTTCTTGACACCATGAAGTGCCTTTTGTACT
TAGCTTTTTTATTATCGGGGTGAATTGCAAGTTCACCATAGTTTTTCCATACAACCGAAAAGGAACTGGA
AAAATGTTCTTCCAATTACCATATTGCCCCGTCAAGCTCAGATTTAAATTGGCATAATGACTTAATAGGCA
CAGCCTTACAAGTCAAAATGCCCAAGAGTCACAAGGCTATTCAAGCAGACGGTTGGATGTGTGATGCTTCCA
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CATCTGTAGAACAATGCAAGGAAAGCATTGAACAAACGAAACAAGGAACTTGGCTGAATCCAGGCTTCCCTC
CTCAAAGTTGTGGATATGCAACTGTGACGGATGCTGAAGCAGCGATTGTCCAGGTGACTCCTCACCATGTGC
TTGTTGATGAATACACAGGAGAATGGGTTGATTACAGTTCATCAACGGAAAATGCAGCAATGACATATGCC
CCACTGTCCATAACTCCACAACCTGGCATTCCGACTATAAGGTCAAAGGGCTATGTGATTCTAACCTCATTT
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GTAATACTTTGCTTATGAACTGGAGACAAGGCCTGCAAAATGCAGTACTGCAAGCATTGGGGAGTCAGAC
TCCCATCAGGTGTCTGGTTCGAGATGGCTGATAAGGATCTCTTTGCTGCAGCCAGATTCCCTGAATGCCAG
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TGGATTATTCCCTCTGCCAAGAAACCTGGAGCAAAATCAGAGCGGGTCTTCCCATCTCTCCAGTGGATCTCA
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CCACAGAAAGGGAAGTGTGGGATGACTGGGCTCCATATGAAGACGTGGAAATTGGACCCAATGGAGTTCTGA
GGACCAGTTCAGGATATAAGTTTCCTTTATATATGATTGGACATGGTATGTTGGACTCCGATCTTCATCTTA
GCTCAAAGGCTCAGGTGTTTGAACATCCTCACATTCAAGACGCTGCTTCGCAGCTTCCTGATGATGAGACTT
TATTTTTTGGTGATACTGGGCTATCCAAAATCCAATCGAGTTTGTAGAAGGTTGGTTCAGTAGTTGGAAGA
GCTCTATTGCCTCTTTTTTCTTTATCATAGGGTTAATCATTGGACTATTCTTGGTCTCCGAGTTGGTATTT
ATCTTTGCATTAAATTAAAGCACACCAAGAAAAGACAGATTTATACAGACATAGAGATGAACCGACTTGGGA
AGTAACTCAAATCCTGCACAACAGATTCTTCATGTTTGAACCAAATCAACTTGTGATATCATGCTCAAAGAG
GCCTTAATTATATTTTAATTTTAAATTTTATGAAAAAACTAACAGCAATCATGGAAGTCCACGATTTTGA
GACCGACGAGTTCAATGATTTCAATGAAGATGACTATGCCACAAGAGAATTCTGAATCCCGATGAGCGCAT
GACGTACTTGAATCATGCTGATTACAATTTGAATTCTCCTCTAATTAGTGATGATATTGACAATTTGATCAG
GAAATTCAATTCTCTTCCGATTCCCTCGATGTGGGATAGTAAGAACTGGGATGGAGTTCTTGAGATGTTAAC
ATCATGTCAAGCCAATCCCATCTCAACATCTCAGATGCATAAATGGATGGGAAGTTGGTTAATGTCTGATAA
TCATGATGCCAGTCAAGGGTATAGTTTTTTACATGAAGTGGACAAAGAGGCAGAAATAACATTTGACGTGGT

FIGURE 11 continued

GGAGACCTTCATCCGCGGCTGGGGCAACAAACCAATTGAATACATCAAAAAGGAAAGATGGACTGACTCATT
CAAAATTCTCGCTTATTTGTGTCAAAAGTTTTTGGACTTACACAAGTTGACATTAATCTTAAATGCTGTCTC
TGAGGTGGAATTGCTCAACTTGGCGAGGACTTTCAAAGGCAAAGTCAGAAGAAGTTCTCATGGAACGAACAT
ATGCAGGCTTAGGGTTCCAGCTTGGGTCTACTTTTATTTTCAAGAGGATGGGCTTACTTCAAGAACTTGA
TATTTCTAATGGACCGAACTTTCTGTTAATGGTCAAAGATGTGATTATAGGGAGGATGCAACCGGTGCTATC
CATGGTATGTAGAATAGACAACCTGTTCTCAGAGCAAGACATCTTCTCCCTTCTAAATATCTACAGAATTGG
AGATAAAATTGTGGAGAGGCAGGGAAATTTTTCTTATGACTTGATTAAATGGTGGAAACCGATATGCAACTT
GAGGCTGATGAAATTAGCAAGAGAATCAAGGCCTTTAGTCCCAATTCCTCATTTTTGAAAAATCATATCAA
GACTTCTGTTGATGAAGGGGCAAAATTGACCGAGGTATAAGATTCCTCCATGATCAGATAATGAGTGTGAA
AACAGTGGATCTCACACTGGTGATTTATGGATCGTTCAGACATTGGGGTCATCCTTTTATAGATTATTACGC
TGGACTAGAAAAATTACATTCCCAAGTAACCATGAAGAAAGATATTGATGTGTCTATGCAAAAAGCACTTGC
AAGTGATTTAGCTCGGATTGTTCTATTTCAACAGTTCAATGATCATAAAAAGTGGTTCGTGAATGGAGACTT
GCTCCCTCATGATCATCCCTTTAAAGTCATGTTAAAGAAATACATGGCCACAGCTGCTCAAGTTCAAGA
TTTTGGAGATAAATGGCATGAACCTCCGCTGATTAAATGTTTTGAAATACCCGACTTACTAGACCCATCGAT
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TCCTATCCCTAGTAAAAAGGTGTTGCAGACTATGTTGGACACAAAGGCTACCAATTGGAAAGAATTTCTTAA
AGAGATTGATGAGAAGGGCTTAGATGATGATGATCTAATTATTGGTCTTAAAGGAAAGGAGAGGGAACTGAA
GTTGGCAGGTAGATTTTTCTCCCTAATGTCTTGAAATTGCGAGAATACTTTGTAATTACCGAATATTTGAT
AAAGACTCATTTCGTCCCTATGTTTAAAGGCCTGACAATGGCGGACGATCTAACTGCAGTCATTAAAAAGAT
GTTAGATTCCCTCATCCGCCAAGGATTGAAGTCATATGAGGCAATTTGCATAGCCAATCACATTGATTACGA
AAAATGGAATAACCACCAAAGGAAGTTATCAAACGGCCAGTGTTCCGAGTTATGGGCCAGTTCTTAGGTTA
TCCATCCTTAATCGAGAGAACTCATGAATTTTTTGAGAAAAGTCTTATATACTACAATGGAAGACCAGACTT
GATGCGTGTTTACAACAACACACTGATCAATTC AACCTCCCAACGAGTTTGTGGCAAGGACAAGAGGGTGG
ACTGGAAGGTCTACGGCAAAAAGGATGGAGTATCCTCAATCTACTGGTTATTCAAAGAGAGGCTAAAATCAG
AAACACTGCTGTCAAAGTCTTGGCACAAGGTGATAATCAAGTTATTTGCACACAGTATAAAACGAAGAAATC
GAGAAACGTTGTAGAATTACAGGGTGCTCTCAATCAAATGGTTTTCTAATAATGAGAAAATTATGACTGCAAT
CAAAATAGGGACAGGGAAGTTAGGACTTTTTGATAAATGACGATGAGACTATGCAATCTGCAGATTACTTGAA
TTATGGAAAAATACCGATTTTCCGTGGAGTGATTAGAGGGTTAGAGACCAAGAGATGGTCACGAGTGAATTG
TGTCACCAATGACCAAATACCCACTTGTGTCTAATATAATGAGCTCAGTTTCCACAAATGCTCTCACCCTAGC
TCATTTTGTCTGAGAACCAATCAATGCCATGATACAGTACAATTATTTTGGGACATTTGCTAGACTCTTGTT
GATGATGCATGATCCTGCTCTTCGTCAATCATTGTATGAAGTTCAAGATAAGATACCGGGCTTGCACAGTTC
TACTTTCAAATACGCCATGTTGTATTTGGACCTTCCATTGGAGGAGTGTCTGGGCATGTCTTTGTCCAGGTT
TTTGATTAGAGCCTTCCAGATCCCGTAACAGAAAGTCTCTCATTCTGGAGATTCTCCATGTaCATGCTCG
AAGTGAGCATCTGAAGGAGATGAGTGCAGTATTTGGAAACCCGAGATAGCCAAGTTTTCGAATAACTCACAT
AGACAAGCTAGTAGAAGATCCAACCTCTCTGAACATCGCTATGGGAATGAGTCCAGCGAAGTTGTTAAAGAC
TGAGGTTAAAAATGCTTAATCGAATCAAGACAAACCATCAGGAACCAGGTGATTAAGGATGCAACCATATA

FIGURE 11 continued

TTTGTATCATGAAGAGGATCGGCTCAGAAGTTTCTTATGGTCAATAAATCCTCTGTTCCCTAGATTTTTAAG
TGAATTCAAATCAGGCACTTTTTTGGGAGTCGCAGACGGGCTCATCAGTCTATTTCAAAATTCCTCGTACTAT
TCGGAACCTCCTTTAAGAAAAAGTATCATAGGGAATTGGATGATTTGATTGTGAGGAGTGAGGTATCCTCTTT
GACACATTTAGGGAACTTCATTTGAGAAGGGGATCATGTAAAATGTGGACATGTTTCAGCTACTCATGCTGA
CACATTAAGATACAAATCCTGGGGCCGTACAGTTATTGGGACAACTGTACCCCATCCATTAGAAAATGTTGGG
TCCACAACATCGAAAAGAGACTCCTTGTGCACCATGTAACACATCAGGGTTCAATTATGTTTCTGTGCATTG
TCCAGACGGGATCCATGACGTCTTTAGTTACAGGGGACCATTGCCCTGCTTATCTAGGGTCTAAAACATCTGA
ATCTACATCTATTTTGCAGCCTTGGGAAAGGGAAAGCAAAGTCCCACTGATTAAAAGAGCTACACGTCTTAG
AGATGCTATCTCTTGGTTTGTGAACCCGACTCTAACTAGCAATGACTATACTTTCTAACATCCACTCTTT
AACAGGCGAAGAATGGACCAAAGGCAGCATGGGTTCAAAAGAACAGGGTCTGCCCTTCATAGGTTTTTCGAC
ATCTCGGATGAGCCATGGTGGGTTTCGCATCTCAGAGCACTGCAGCATTGACCAGGTTGATGGCAACTACAGA
CACCATGAGGGATCTGGGAGATCAGAAATTTTCGACTTTTTATTCCAGGCAACGTTGCTCTATGCTCAGATTAC
CACCCTGTTGCAAGAGACGGATGGATCACCAGTTGTACAGATCATTATCATATTGCCTGTAAGTCTGTGTTT
GAGACCCATAGAAGAGATCACCTGGACTCAAGTATGGACTACACGCCCCCAGATGTATCCCATGTGCTGAA
GACATGGAGGAATGGGGAAGGTTCTGGGGACAAGAGATAAAACAGATCTATCCTTTAGAAGGGAATTGGAA
GAATTTAGCACCTGCTGAGCAATCCTATCAAGTCGGCAGATGTATAGGTTTTCTATATGGAGACTTGGCGTA
TAGAAAATCTACTCATGCCGAGGACAGTTCTCTATTTCTCTATCTATAAAGGTCGTATTAGAGGTCGAGG
TTTCTTAAAAGGGTTGCTAGACGGATTAATGAGAGCAAGTTGCTGCCAAGTAATACACCGGAGAAGTCTGGC
TCATTTGAAGAGGCCGCCAACGCAGTGTACGGAGGTTTGATTTACTTGATTGATAAATTGAGTGTATCACC
TCCATTCTTTCTCTTACTAGATCAGGACCTATTAGAGACGAATTAGAAACGATTCCCCACAAGATCCCAAC
CTCCTATCCGACAAGCAACCGTGATATGGGGGTGATTGTCAGAAATTACTTCAAATACCAATGCCGTCTAAT
TGAAAAGGGAAAATACAGATCACATTATTCACAATTATGGTTATTCTCAGATGTCTTATCCATAGACTTCAT
TGGACCATCTCTATTTCCACCACCCTCTTGCAAATCCTATACAAGCCATTTTTATCTGGGAAAGATAAGAA
TGAGTTGAGAGAGCTGGCAAATCTTTCTTCATTGCTAAGATCAGGAGAGGGGTGGGAAGACATACATGTAAA
ATTCTTCACCAAGGACATATTATTGTGTCCAGAGGAAATCAGACATGCTTGCAAGTTCCGGATTGCTAAGGA
TAATAATAAAGACATGAGCTATCCCCCTTGGGGAAGGGAATCCAGAGGGACAATTACAACAATCCCTGTTTA
TTATACGACCACCCTTACCCAAAGATGCTAGAGATGCCCTCCAAGAATCCAAATCCCCTGCTGTCCGGAAT
CAGGTTGGGCCAGTTACCAACTGGCGCTCATTATAAAATTCGGAGTATATTACATGGAATGGGAATCCATTA
CAGGGACTTCTTGAGTTGTGGAGACGGCTCCGGAGGGATGACTGCTGCATTACTACGAGAAAATGTGCATAG
CAGAGGAATATTCAATAGTCTGTTAGAATTATCAGGGTCAGTCATGCGAGGCGCCTCTCCTGAGCCCCCAG
TGCCCTAGAAACTTTAGGAGGAGATAAATCGAGATGTGTAAATGGTGAAACATGTTGGGAATATCCATCTGA
CTTATGTGACCCAAGGACTTGGGACTATTTCTCCGACTCAAAGCAGGCTTGGGGCTTCAAATTGATTTAAT
TGTAATGGATATGGAAGTTCGGGATTCTTCTACTAGCCTGAAAATTGAGACGAATGTTAGAAATTATGTGCA
CCGGATTTTGGATGAGCAAGGAGTTTAAATCTACAAGACTTATGGAACATATATTGTGAGAGCGAAAAGAA
TGCAGTAACAATCCTTGGTCCCATGTTCAAGACGGTCGACTTAGTTCAAACAGAAATTTAGTAGTTCTCAAAC
GTCTGAAGTATATATGGTATGTAAAGGTTTGAAGAAATTAATCGATGAACCCAATCCCGATTGGTCTTCCAT

FIGURE 11 continued

CAATGAATCCTGGAAAAACCTGTACGCATTCCAGTCATCAGAACAGGAATTTGCCAGAGCAAAGAAGGTTAG
TACATACTTTTACCTTGACAGGTATTCCCTCCCAATTCATTTCCTGATCCTTTTGTAACATTGAGACTATGCT
ACAAATATTCGGAGTACCCACGGGTGTGTCTCATGCGGCTGCCTTAAATCATCTGATAGACCTGCAGATTT
ATTGACCATTAGCCTTTTTTATATGGCGATTATATCGTATTATAACATCAATCATATCAGAGTAGGACCGAT
ACCTCCGAACCCCCCATCAGATGGAATTGCACAAAATGTGGGGATCGCTATAACTGGTATAAGCTTTTGGCT
GAGTTTGATGGAGAAAGACATTCCACTATATCAACAGTGTTTAGCAGTTATCCAGCAATCATTCCCGATTAG
GTGGGAGGCTGTTTCAGTAAAAGGAGGATACAAGCAGAAGTGGAGTACTAGAGGTGATGGGCTCCCAAAGA
TACCCGAATTTTCAGACTCCTTGGCCCCAATCGGGAAGTGGATCAGATCTCTGGAATTGGTCCGAAACCAAGT
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GATGTTGAAGAGTGACCTACATGAGGAAAACTCTTGGAGAGATTAAAAAATCATGAGGAGACTCCAACTTT
AAGTATGAAAAAACTTTGATCCTTAAGACCCTCTTGTGGTTTTTATTTTTTATCTGGTTTTGTGGTCTTCG
T

FIGURE 11 continued

Nucleic Acid Sequence of the M Protein Gene for VSV Mutant AVI

ATGAGTTCCTTAAAGAAGATTCTCGGTCTGAAGGGGAAAGGTAAGAAATCTAAGAAATTAGGGATCGCACCA
CCCCCTTATGAAGAGGACACTAACATGGAGTATGCTCCGAGCGCTCCAATTGACAAATCCTATTTTGGAGTT
GACGAGATGGACACTCATGATCCGCATCAATTAAGATATGAGAAATTCCTTCTTTACAGTGAAAATGACGGTT
AGATCTAATCGTCCGTTCAGAACATACTCAGATGTGGCAGCCGCTGTATCCCATTGGGATCACATGTACATC
GGAATGGCAGGGAAACGTCCCTTCTACAAGATCTTGGCTTTTTTGGGTTCTTCTAATCTAAAGGCCACTCCA
GCGGTATTGGCAGATCAAGGTCAACCAGAGTATCACGCTCACTGTGAAGGCAGGGCTTATTTGCCACACAGA
ATGGGGAAGACCCCTCCCATGCTCAATGTACCAGAGCACTTCAGAAGACCATTCAATATAGGTCTTTACAAG
GGAACGGTTGAGCTCACAATGACCATCTACGATGATGAGTCACTGGAAGCAGCTCCTATGATCTGGGATCAT
TTCAATTCTTCCAAATTTTCTGATTTTCAGAGAGAAGGCCTTAATGTTTGGCCTGATTGTGCGAGAAAAAGGCA
TCTGGAGCTTGGTTCCTGGATTCTGTCAGACACTTCAAATGA

FIGURE 12

Amino Acid Sequence for the M Protein of VSV Mutant AV1

MSSLKKILGLKGKSKKLGIAPPPYEEDTNMEYAPSAPIDKSYFGVDERDTHDPHQLRYEKFFFTVKMTV
RSNRPFRTYSDVAAAVSHWDHMYIGMAGKRPFYKILAFGLSSNLKATPAVLADQGQPEYHAHCEGRAYLPHR
MGKTPPMLNVPEHFRPFNIGLYKGTVELTMTIYDDDESLEAAPMIWDHFNSSKFSDFREKALMFGLIVEKKA
SGAWVLDSVSHFK.

FIGURE 13

Genome sequence for VSV Mutant AV2

ACGAAGACAAACAAACCATTATTATCATTTAAAAGGCTCAGGAGAACTTTAACAGTAATCAAAATGTCTGTT
ACAGTCAAGAGAATCATTGACAACACAGTCATAGTTCCAAAACCTTCCTGCAAATGAGGATCCAGTGGAAATAC
CCGGCAGATTACTTCAGAAAATCAAAGGAGATTCTCTTTACATCAATACTACAAAAGTTTGTCTAGATCTA
AGAGGATATGTCTACCAAGGCCTCAAATCCGGAAATGTATCAATCATACTGTCAACAGCTACTTGTATGGA
GCATTGAAGGACATCCGGGGTAAGTTGGATAAAGATTGGTCAAGTTTCGGAATAAACATCGGGAAGGCAGGG
GATACAATCGGAATATTTGACCTTGTATCCTTGAAAGCCCTGGACGGTGTACTTCCAGATGGAGTATCGGAT
GCTTCCAGAACCAGCGCAGATGACAAATGGTTGCCTTTGTATCTACTTGGCTTATACAGAGTGGGCAGAAACA
CAAATGCCTGAATACAGAAAAAGGCTCATGGATGGGCTGACAAATCAATGCAAAATGATCAATGAACAGTTT
GAACCTCTTGTGCCAGAAGGTCGTGACATTTTTGATGTGTGGGGAAATGACAGTAATTACACAAAAATTGTC
GCTGCAGTGGACATGTTCTTCCACATGTTCAAAAACATGAATGTGCCTCGTTCAGATACGGAACTATTGTT
TCCAGATTCAAAGATTGTGCTGCATTGGCAACATTTGGACACCTCTGCAAAATAACCGGAATGTCTACAGAA
GATGTAACGACCTGGATCTTGAACCGAGAAGTTGCAGATGAGATGGTCCAAATGATGCTTCCAGGCCAAGAA
ATTGACAAGGCCGATTTCATACATGCCTTATTTGATCGACTTTGGATTGTCTTCTAAGTCTCCATATTCTTCC
GTCAAAAACCTTGCTTCCACTTCTGGGGGCAATTGACAGCTCTTCTGCTCAGATCCACCAGAGCAAGGAAT
GCCCCAGACCTGATGACATTGAGTATACATCTCTTACTACAGCAGGTTTGTGTACGCTTATGCAGTAGGA
TCCTCTGCTGACTTGGCACAACAGTTTTGTGTTGGAGATAGCAAATACACTCCAGATGATAGTACCGGAGGA
TTGACGACTAATGCACCGCCACAAGGCAGAGATGTGGTCAATGGCTCGGATGGTTTGAAGATCAAAACAGA
AAACCGACTCCTGATATGATGCAGTATGCGAAACGAGCAGTCATGTCACTGCAAGGCCAAGAGAGAAGACA
ATTGGCAAGTATGCTAAGTCAGAATTTGACAAATGACCTATAATTCTCAGATCACCTATTATATATTATGC
TACATATGAAAAAACTAACAGATATCATGGATAATCTCAGAAAAGTTCTGAGTATCTCAAGTCTTATTCT
CGTCTAGATCAGGCGGTAGGAGAGATAGATGAGATCGAAGCACAAACGAGCTGAAAAGTCCAATTATGAGTTG
TTCCAAGAGGACGGAGTGGAAGAGCATACTAGGCCCTCTTATTTTCAGGCAGCAGATGATTCTGACACAGAA
TCTGAACCAGAAATTGAAGACAATCAAGGCTTGTATGTACCAGATCCGGAAGCTGAGCAAGTTGAAGGCTTT
ATACAGGGGCCTTTAGATGACTATGCGGATGAGGACGTGGATGTTGTATTCACTTCGGACTGGAAACAGCCT
GAGCTTGAATCCGACGAGCATGGAAAAGACCTTACGGTTGACATTGCCAGAGGGTTTAAGTGGAGAGCAGAAA
TCCCAGTGGCTTTTGACGATTAAAGCAGTCGTTCAAAGTGCCAAACACTGGAATCTGGCAGAGTGCACATTT
GAAGCATCGGGAGAAGGGGTATCATAAAAAAGCGCCAGATAACTCCGGATGTATATAAGGTCCTCCAGTG
ATGAACACACATCCGTCCCAATCGGAAGCCGTATCAGATGTTTGGTCTCTCTCAAAGACATCCATGACTTTC
CAACCCAAGAAAGCAAGTCTTCAGCCTCTCACCATATCCTTGGATGAATTGTTCTCATCTAGAGGAGAATTC
ATCTCTGTGCGAGGTAACGGACGAATGTCTCATAAAGAGGCCATCCTGCTCGGTCTGAGGTACAAAAGTTG
TACAATCAGGCGAGAGTCAAATATTCTCTGTAGACTATGAAAAAAGTAACAGATATCACAATCTAAGTGTT
ATCCCAATCCATTTCATCATGAGTTCTTAAAGAAGATTCTCGGTCTGAAGGGGAAAGGTAAGAAATCTAAGA
AATTAGGGATCGCACCACCCCTTATGAAGAGGACACTAACATGGAGTATGCTCCGAGCGCTCCAATTGACA
AATCCTATTTTGGAGTTGACGAGATGGACACTCATGATCCGCATCAATTAAGATATGAGAAATCTTCTTTA
CAGTGAAGATGACGGTTAGATCTAATCGTCCGTTGAGAACATACTCAGATGTGGCAGCCGCTGTATCCCAT

Figure 14

GGGATCACATGTACATCGGAATGGCAGGGAAACGTCCCTTCTACAAGATCTTGGCTTTTTTGGGTTCTTCTA
ATCTAAAGGCCACTCCAGCGGTATTGGCAGATCAAGGTCAACCAGAGTATCACGCTCACTGTGAAGGCAGGG
CTTATTTGCCACACAGAATGGGGAAGACCCCTCCCATGCTCAATGTACCAGAGCACTTCAGAAGACCATTCA
ATATAGGTCTTTTACAAGGGAACGGTTGAGCTCACAATGACCATCTACGATGATGAGTCACTGGAAGCAGCTC
CTATGATCTGGGATCATTTCAATTCTTCCAAATTTTCTGATTTCAAGAGAGAAGGCCTTAATGTTTGGCCTGA
TTGTCGAGAAAAAGGCATCTGGAGCTTGGTTTCTGGATTCTGTCTAGACACTTCAAATGAGCTAGTCTAGCTT
CCAGCTTCTGAACAATCCCCGGTTTACTCAGTCTCTCCTAATTCAGCCTTTTGAACAATAATATCCTGTC
TTTTCTATCCCTATGAAAAAACTAACAGAGATCGATCTGTTTCTTGACACCATGAAGTGCTTTTGTACT
TAGCTTTTTTATTCAATCGGGGTGAATTGCAAGTTCACCATAGTTTTTCCATACAACCAAAAAGGAACTGGA
AAAATGTTTCTTCCAATTACCATTATTGCGCGTCAAGCTCAGATTTAAATTGGCATAATGACTTAATAGGCA
CAGCCTTACAAGTCAAAATGCCAAGAGTCACAAGGCTATTCAAGCAGACGGTTGGATGTGTATGCTTCCA
AATGGGTCACTACTTGTGATTTCCGCTGGTACGGACCGAAGTATATAACACATTCCATCCGATCCTTCACTC
CATCTGTAGAACAATGCAAGGAAAGCATTGAACAAACGAAACAAGGAACTTGGCTGAATCCAGGCTTCCCTC
CTCAAAGTTGTGGATATGCAACTGTGACGGATGCTGAAGCAGCGATTGTCCAGGTGACTCCTCACCATGTGC
TTGTTGATGAATACACAGGAGAATGGGTTGATTACAGTTCATCAACGGAAAATGCAGCAATGACATATGCC
CCACTGTCCATAACTCCACAACCTGGCATTCCGACTATAAGGTCAAAGGGCTATGTGATTCTAACCTCATTT
CCATGGACATCACCTTCTTCTCAGAGGACGGAGAGCTATCATCCCTAGGAAAGGAGGGCACAGGGTTGAGAA
GTAACACTTTTGCTTATGAACTGGAGACAAGGCCTGCAAATGCAGTACTGCAAGCGTTGGGGAGTCAGAC
TCCCATCAGGTGTATGGTTCGAGATGGCTGATAAGGATCTCTTTGCTGCAGCCAGATTCCCTGAATGCCAG
AAGGGTCAAGTATCTCTGCTCCATCTCAGACCTCAGTGGATGTAAGTCTCATTCCAGGACGTTGAGAGGATCT
TGGATTATTCCCTCTGCCAAGAAACCTGGAGCAAATCAGAGCGGGTCTTCCCATCTCTCCAGTGGATCTCA
GCTATCTTGCTCCTAAAAACCAGGAACCGGTCTGTCTTTACCATAATCAATGGTACCCTAAAATACTTTG
AGACCAGATACATCAGAGTCGATATTGCTGCTCCAATCCTCTCAAGAATGGTCCGAATGATCAGTGGAACCTA
CCACAGAAAGGGAAGTGTGGGATGACTGGGCTCCATATGAAGACGTGGAAATGGACCCAATGGAGTTCTGA
GGACCAGTTCAGGATATAAGTTTCTTTTATATATGATTGGACATGGTATGTTGGACTCCGATCTTCATCTTA
GCTCAAAGGCTCAGGTGTTTGAACATCCTCACATTCAAGACGCTGCTGCGCAGCTTCTTGATGATGAGACTT
TATTTTTTGGTGATACTGGGCTATCCAAAAATCCAATCGAGTTTGTAGAAGGTTGGTTCAGTAGTTGGAAGA
GCTCTATTGCCTCTTTTTTCTTTATCATAGGGTTAATCATTGGACTATTCTTGGTTCTCCGAGTTGGTATTT
ATCTTTGCATTAAATTAAAGCACACCAAGAAAAGACAGATTTATACAGACATAGAGATGAACCGACTTGGA
AGTAACTCAAATCCTGCACAACAGATTCTTCATGTTTGAACCAAATCAACTTGTGATATCATGCTCAAAGAG
GCCTTAATTATATTTTAATTTTATGAAAAAACTAACAGCAATCATGGAAGTCCACGATTTTGA
GACCGACGAGTTCAATGATTTCAATGAAGATGACTATGCCACAAGAGAATTCTGAATCCCGATGAGCGCAT
GACGTACTTGAATCATGCTGATTACAATTTGAATTTCTCTCTAATTAGTGATGATATTGACAATTTGATCAG
GAAATTCATTTCTTCCGATTCCCTCGATGTGGGATAGTAAGAACTGGGATGGAGTTCTTGAGATGTTAAC
ATCATGTCAAGCCAATCCCATCTCAACATCTCAGATGCATAAATGGATGGGAAGTTGGTTAATGTCTGATAA
TCATGATGCCAGTCAAGGGTATAGTTTTTTACATGAAGTGGACAAAGAGGCAGAAATAACATTTGACGTGGT

Figure 14 continued

GGAGACCTTCATCCGCGGCTGGGGCAACAAACCAATTGAATACATCAAAAAGGAAAGATGGACTGACTCATT
CAAAATTCTCGCTTATTTGTGTCAAAAGTTTTTGGACTTACACAAGTTGACATTAATCTTAAATGCTGTCTC
TGAGGTGGAATTGCTCAACTTGGCGAGGACTTTCAAAGGCAAAGTCAGAAGAAGTTCTCATGGAACGAACAT
ATGCAGGCTTAGGGTTCCAGCTTGGGTCTTACTTTTATTTTTCAGAAGGATGGGCTTACTTCAAGAACTTGA
TATTTCTAATGGACCGAAACTTTCTGTTAATGGTCAAAGATGTGATTATAGGGAGGATGCAAACGGTGCTATC
CATGGTATGTAGAATAGACAACCTGTTCTCAGAGCAAGACATCTTCTCCCTTCTAAATATCTACAGAATTGG
AGATAAAATTGTGGAGAGGCAGGGAAATTTTTCTTATGACTTGATTAAAATGGTGGAACCGATATGCAACTT
GAAGCTGATGAAATTAGCAAGAGAATCAAGGCCTTTAGTCCCACAATTCCCTCATTTTGAATCATATCAA
GACTTCTGTTGATGAAGGGGCAAAATTGACCGAGGTATAAGATTCCTCCATGATCAGATAATGAGTGTGAA
AACAGTGGATCTCACACTGGTGATTTATGGATCGTTCAGACATTGGGGTCATCCTTTTATAGATTATTACGC
TGGACTAGAAAAATTACATTCCCAAGTAACCATGAAGAAAGATATTGATGTGTCATATGCAAAGCACTTGC
AAGTGATTTAGCTCGGATTGTTCTATTTCAACAGTTCAATGATCATAAAAAGTGGTTCGTGAATGGAGACTT
GCTCCCTCATGATCATCCCTTTAAAGTCATGTTAAAGAAAATACATGGCCACAGCTGCTCAAGTTCAAGA
TTTTGGAGATAAAATGGCATGAACCTCCGCTGATTAAATGTTTTGAAATACCCGACTTACTAGACCCATCGAT
AATATACTCTGACAAAAGTCATTCAATGAATAGGTGAGAGGTGTTGAAACATGTCCGAATGAATCCGAACAC
TCCTATCCCTAGTAAAAAGGTGTTGCAGACTATGTTGGACACAAAGGCTACCAATTGGAAAGAATTTCTTAA
AGAGATTGATGAGAAAGGCTTAGATGATGATGATCTAATTATTGGTCTTAAAGGAAAGGAGAGGGAACCTGAA
GTTGGCAGGTAGATTTTTCTCCCTAATGTCTTGGAAATTGCGAGAATACTTTGTAATTACCGAATATTTGAT
AAAGACTCATTTTCGTCCCTATGTTTAAAGGCCTGACAATGGCGGACGATCTAACTGCAGTCATTAAAAAGAT
GTTAGATTCTCATCCGGCCAAGGATTGAAGTCATATGAGGCAATTTGCATAGCCAATCACATTGATTACGA
AAAATGGAATAACCACCAAAGGAAGTTATCAAACGGCCAGTGTTCCGAGTTATGGGCCAGTTCCTTAGGTTA
TCCATCCTTAATCGAGAGAACTCATGAATTTTTTGGAGAAAAGTCTTATATACTACAATGGAAGACCAGACTT
GATGCGTGTTTACAACAACACACTGATCAATTC AACCTCCCAACGAGTTTGTGTCAGGACAAGAGGGTGG
ACTGGAAGGTCTACGGCAAAAAGGATGGAGTATCCTCAATCTACTGGTTATTCAAAGAGAGGCTAAAATCAG
AAACACTGCTGTCAAAGTCTTGGCACAAGGTGATAATCAAGTTATTTGCACACAGTATAAAACGAAGAAATC
GAGAAACGTTGTAGAATTACAGGGTGCTCTCAATCAAATGGTTTCTAATAATGAGAAAATTATGACTGCAAT
CAAAATAGGGACAGGGAAGTTAGGACTTTTGATAAATGACGATGAGACTATGCAATCTGCAGATTACTTGAA
TTATGGAAAAATACCGATTTTCCGTGGAGTGATTAGAGGGTTAGAGACCAAGAGATGGTCACGAGTGACTTG
TGTCACCAATGACCAAATACCCACTTGTGCTAATATAATGAGCTCAGTTTCCACAAATGCTCTCACCCTAGC
TCATTTTGCTGAGAACCAATCAATGCCATGATACAGTACAATTATTTTGGGACATTTGCTAGACTCTTGTT
GATGATGCATGATCCTGCTCTTCGTCAATCATTGTATGAAGTTCAAGATAAGATACCGGGCTTGACAGTTC
TACTTTCAAATACGCCATGTTGTATTTGGACCCTTCCATTGGAGGAGTGTCTGGGCATGTCTTTGTCCAGGTT
TTTGATTAGAGCCTTCCAGATCCCGTAACAGAAAGTCTCTCATTCTGGAGATTATCCATGTACATGCTCG
AAGTGAGCATCTGAAGGAGATGAGTGCAGTATTTGGAAACCCGAGATAGCCAAGTTTGAATAACTCACAT
AGACAAGCTAGTAGAAGATCCAACCTCTCTGAACATCGCTATGGGAATGAGTCCAGCGAACTTGTTAAAGAC
TGAGGTTAAAAATGCTTAATCGAATCAAGACAAACCATCAGGAACCAGGTGATTAAGGATGCAACCATATA

Figure 14 continued

TTTGTATCATGAAGAGGATCGGCTCAGAAGTTTCTTATGGTCAATAAATCCTCTGTTCCCTAGATTTTAAAG
TGAATTCAAATCAGGCAC'TTTTTGGGAGTCGCAGACGGGCTCATCAGTCTATTTCAAATCTCGTACTAT
TCGGAACCTCTTAAAGAAAAGTATCATAGGGAATTGGATGATTTGATTGTGAGGAGTGAGGTATCCTCTTT
GACACATTTAGGGAAAC'TTCATTTGAGAAGGGGATCATGTAAAATGTGGACATGTTTCAGCTACTCATGCTGA
CACATTAAGATACAAATCCTGGGGCCGTACAGTTATTGGGACAAC'TGTACCCCATCCATTAGAAATGTTGGG
TCCACAACATCGAAAAGAGACTCCTTGTGCACCATGTAACACATCAGGGTTC'AATTATGTTTCTGTGCATTG
TCCAGACGGGATCCATGACGTC'TTTAGTTACGGGGACCATTGCCTGCTTATCTAGGGTCTAAAACATCTGA
ATCTACATCTATTTTGCAGCCTTGGGAAAGGGAAAGCAAAGTCCCACTGATTAAAAGAGCTACACGTC'TTAG
AGATGCTATCTCTTGGTTTGTGTAACCCGACTCTAAACTAGCAATGACTATACTTTCTAACATCCACTCTTT
AACAGGCGAAGAATGGaCCAAAAGGCAGCATGGGTTCAAAGAACAGGGTCTGCCCTTCATAGGTTTTCGAC
ATCTCGGATGAGCCATGGTGGGTTTCGCATCTCAGAGCACTGCAGCATTGACCAGGTTGATGGCaCTACAGA
CACCATGAGGGATCTGGGAGATCAGAATTTGACTTTTTATTCCAGGCAACGTTGCTCTATGCTCAGATTAC
CACCCTGTTGCAAGAGACGGATGGATCACCAGTTGTACAGATCATTATCATATTGCCTGTAAGTCCCTGTTT
GAGACCCATAGAAGAGATCACCCCTGGACTCAAGTATGGACTACACGCCCCCAGATGTATCCCATGTGCTGAA
GACATGGAGGAATGGGGAAAGGTTCTGTGGGACAAGAGATAAAACAGATCTATCCTTTAGAAAGGGAATTGGAA
GAATTTAGCACCTGCTGAGCAATCCTATCAAGTCGGCAGATGTATAGGTTTCTATATGGAGACTTGGCGTA
TAGAAAATCTACTCATGCCGAGGACAGTTCTCTATTTCTCTATCTATACAAGGTCGTATTAGAGGTCGAGG
TTTCTTAAAGGGTTGCTAGACGGATTAATGAGAGCAAGTTGCTGCCAAGTAATACACCGGAGAAGTCTGGC
TCATTTGAAGAGGCCCGCCAACGCAGTGACGGAGGTTTGATTTACTTGATTGATAAATTGAGTGtATCACC
TCCATTCTTTCTCTTACTAGATCAGGACCTATTAGAGACGAATTAGAAACGATTCCCCACAAGATCCCAAC
CTCCTATCCGACAAGCAACCGTGATATGGGGGTGATTGTGAGAAATTACTTCAAATACCAATGCCGTCTAAT
TGAAAAGGGAAAATACAGATCACATTATTACAATTATGGTTATTCTCAGATGTCTTATCCATAGACTTCAT
TGGACCATCTCTATTTCCACCACCCTCTTGCAAATCCTATACAAGCCATTTTATCTGGGAAAGATAAGAA
TGAGTTGAGAGAGCTGGCAAATCTTCTTCATTGCTAAGATCAGGAGAGGGGTGGGAAGACATACATGTAA
ATTCTTCACCAAGGACATATTATTGTGTCCAGAGGAAATCAGACATGCTTGCAAGTTCGGGATTGCTAAGGA
TAATAATAAGACATGAGCTATCCCCCTTGGGGAAGGGAATCCAGAGGGACAATTACAACAATCCCTGTTTA
TTATACGACCACCCCTTACCCAAAGATGCTAGAGATGCCTCCAAGAATCCAAAATCCCCTGCTGTCCGGAAT
CAGGTTGGGCCAGTTACCAACTGGCGCTCATTATAAAATTCGGAGTATATTACATGGAATGGGAATCCaTTA
CAGGGACTTCTTGAGTTGTGGAGACGGCTCCGGAGGGATGACTGCTGCATTACTACGAGAAAATGTGCATAG
CAGAGGAATATTCAATAGTCTGTTAGAATTATCAGGGTCAGTCATGCGAGGCGCCTCTCCTGAGCCCCCAG
TGCCCTAGAACTTTAGGAGGAGATAAATCGAGATGTGTAAATGGTGAAACATGTTGGGAATATCCATCTGA
CTTATGTGACCCAAGGACTTGGGACTATTTCTCCGACTCAAAGCAGGCTTGGGGCTTCAAATTGATTTAAT
TGTAATGGATATGGAAGTTCGGGATTTCTTCTACTAGCCTGAAAATTGAGACGAATGTTAGAAATTATGTGCA
CCGATTTTGGATGAGCAAGGAGTTTAAATCTACAAGACTTATGGAACATATATTTGTGAGAGCGAAAAGAA
TGCAGTAACAATCCTTGGTCCCATGTTCAAGACGGTCGACTTAGTTCAAACAGAATTTAGTAGTTCTCAAAC
GTCTGAAGTATATATGGTATGTAAAGGTTTGAAGAAATTAATCGATGAACCCAATCCCGATTGGTCTTCCAT

Figure 14 continued

CAATGAATCCTGGAAAAACCTGTACGCATTCCAGTCATCAGAACAGGAATTTGCCAGAGCAAAGAAGGTTAG
TACATACTTTACCTTGACAGGTATTCCCTCCCAATTCATTCTGATCCTTTTGTGAACATTGAGACTATGCT
ACAAATATTTCGGAGTACCCACGGGTGTGTCTCATGCGGCTGCCTTAAATCATCTGATAGACCTGCAGATTT
ATTGACCATTAGCCTTTTTTATATGGCGATTATATCGTATTATAACATCAATCATATCAGAGTAGGACCGAT
ACCTCCGAACCCCCCATCAGATGGAATTGCACAAAATGTGGGGATCGCTATAACTGGTATAAGCTTTTGGCT
GAGTTTGATGGAGAAAGACATTCCACTATATCAACAGTGTTTAGCAGTTATCCAGCAATCATTCCCGATTAG
GTGGGAGGCTGTTTCAGTAAAGGAGGATACAAGCAGAAGTGGAGTACTAGAGGTGATGGGCTCCCAAAGA
TACCCGAATTTAGACTCCTTGGCCCCAATCGGGAAGTGGATCAGATCTCTGGAATTGGTCCGAAACCAAGT
TCGTCTGAATCCATTCAATGAGATCTTGTTCAATCAGCTATGTCGTACAGTGGATAATCATTTGAAATGGTC
AAATTTGCGAAAAAACACAGGAATGATTGAATGGATCAATAGACGAATTTCAAAGAAGACCGGTCTATACT
GATGTTGAAGAGTGACCTACATGAGGAAAACCTTGGAGAGATTAAAAAATCATGAGGAGACTCCAACTTT
AAGTATGAAAAAACTTTGATCCTTAAGACCTCTTGTGGTTTTTTATTTTTATCTGGTTTTGTGGTCTTCG
T

Figure 14 continued

Nucleic Acid Sequence of the M Protein Gene for VSV Mutant AV2

ATGAGTTCCTTAAAGAAGATTCTCGGTCTGAAGGGGAAAGGTAAGAAATCTAAGAAATTAGGGATCGCACCA
CCCCCTTATGAAGAGGACACTAACATGGAGTATGCTCCGAGCGCTCCAATTGACAAATCCTATTTTGGAGTT
GACGAGAGGGGACACTCATGATCCGCATCAATTAAGATATGAGAAATTCTTCTTTACAGTGAAAATGACGGTT
AGATCTAATCGTCCGTTCAGAACATACTCAGATGTGGCAGCCGCTGTATCCCATTGGGATCACATGTACATC
GGAATGGCAGGGAAACGTCCCTTCTACAAGATCTTGGCTTTTTTGGGTTCTTCTAATCTAAAGGCCACTCCA
GCGGTATTGGCAGATCAAGGTCAACCAGAGTATCACGCTCACTGTGAAGGCAGGGCTTATTTGCCACACAGA
ATGGGGAAGACCCCTCCCATGCTCAATGTACCAGAGCACTTCAGAAGACCATTCAATATAGGTCTTTACAAG
GGAACGGTTGAGCTCACAATGACCATCTACGATGATGAGTCACTGGAAGCAGCTCCTATGATCTGGGATCAT
TTCAATTCTTCCAAATTTTCTGATTTTCAGAGAGAAGGCCTTAATGTTTGGCCTGATTGTGCGAGAAAAAGGCA
TCTGGAGCTTGGGTCCTGGATTCTGTCAGCCACTTCAAATGA

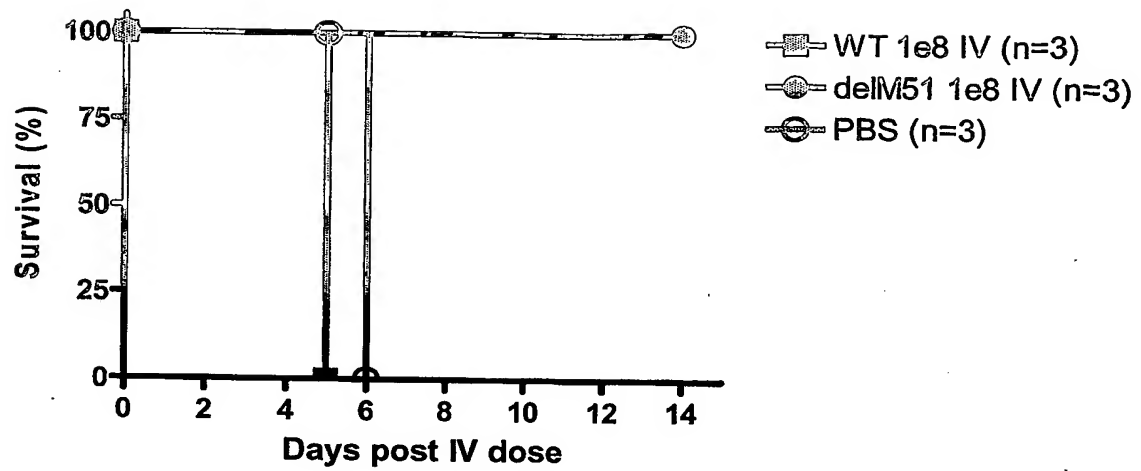
FIGURE 15

Amino Acid Sequence for the M Protein of VSV Mutant AV2

MSSLKKILGLKGKGKSKKLGIAPPPYEEDTNMEYAPSAPIDKSYFGVDEMDTHDPHQLRYEKFFFTVKMTV
RSNRPFRTYSDVAAAVSHWDHMYIGMAGKRPFYKILAF LGSSNLKATPAVLADQGQPEYHAHCEGRAYLPHR
MGKTPPMLNVPEHFRRPFNIGLYKGTVELTMTIYDDDESLEAAPMIWDHFNSSKFSDFREKALMFGLIVEKKA
SGAWFLDSVRHFK

FIGURE 16

A



B

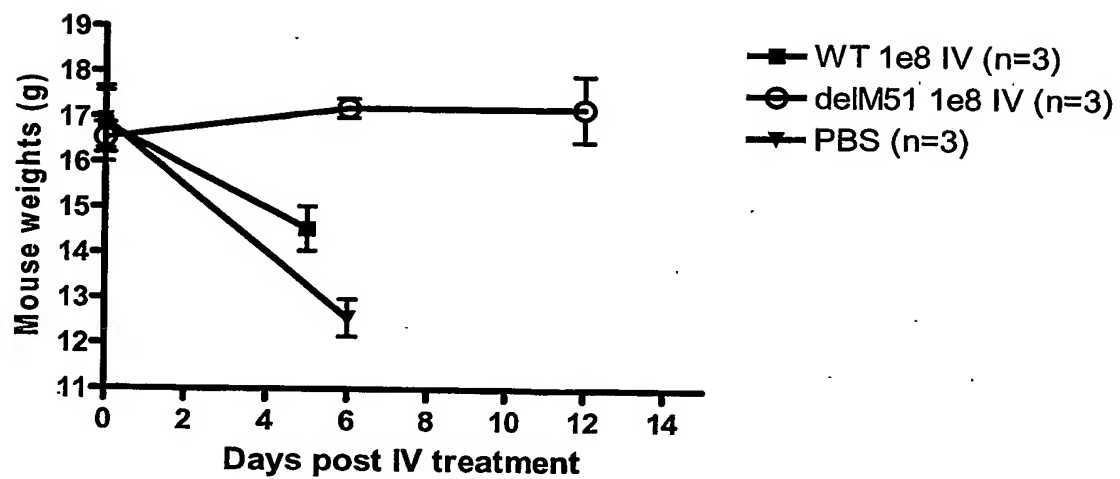
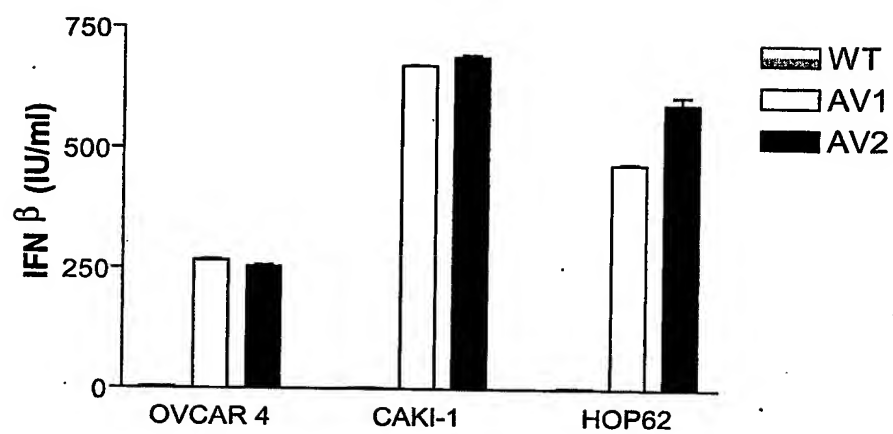
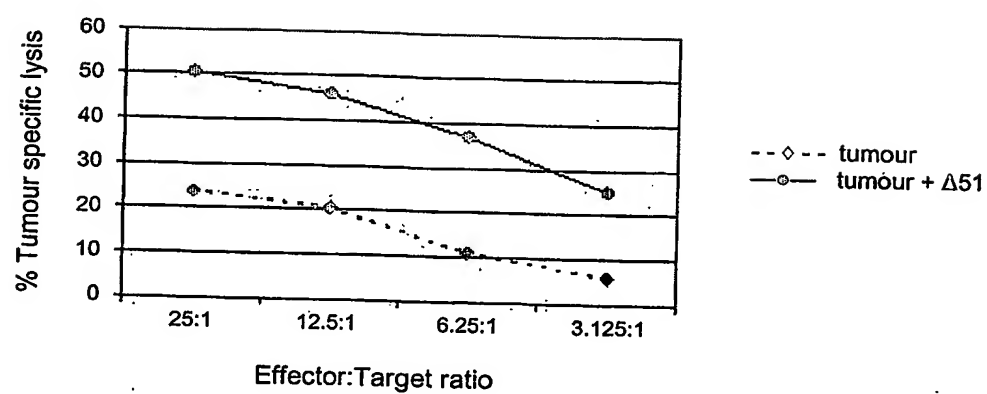


FIGURE 17A-B

**FIGURE 18**

A



B

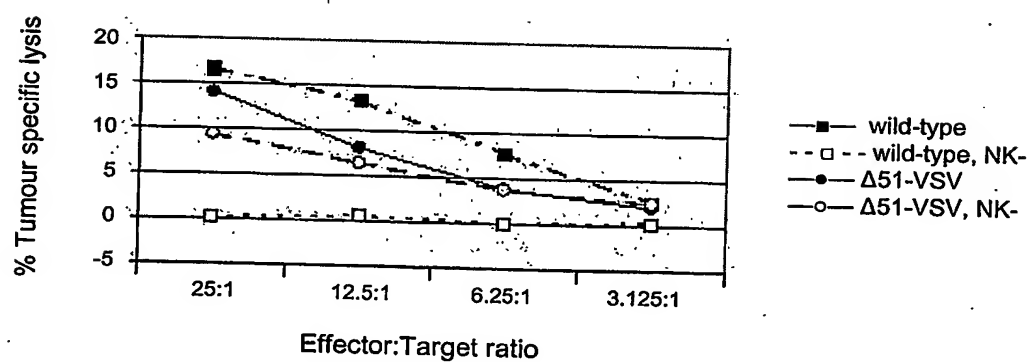


FIGURE 19

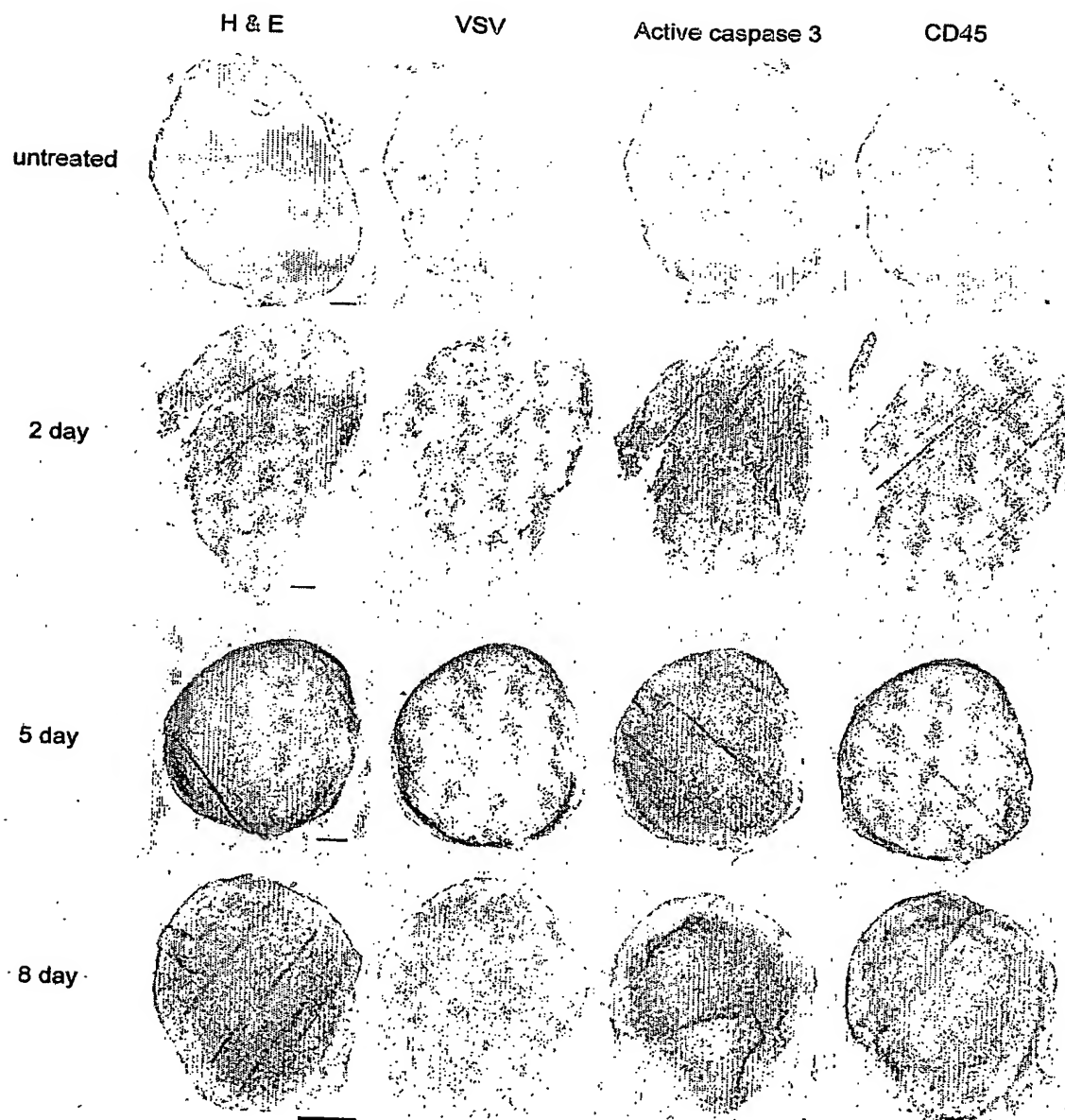


FIGURE 20